STUDENT EDUCATION NUMBER									

GOVERNMENT OF SAMOA
MINISTRY OF EDUCATION, SPORTS AND CULTURE

Samoa Secondary Leaving Certificate

DESIGN TECHNOLOGY

2017

QUESTION and ANSWER BOOKLET

Time allowed: 3 Hours & 10 minutes

INSTRUCTIONS

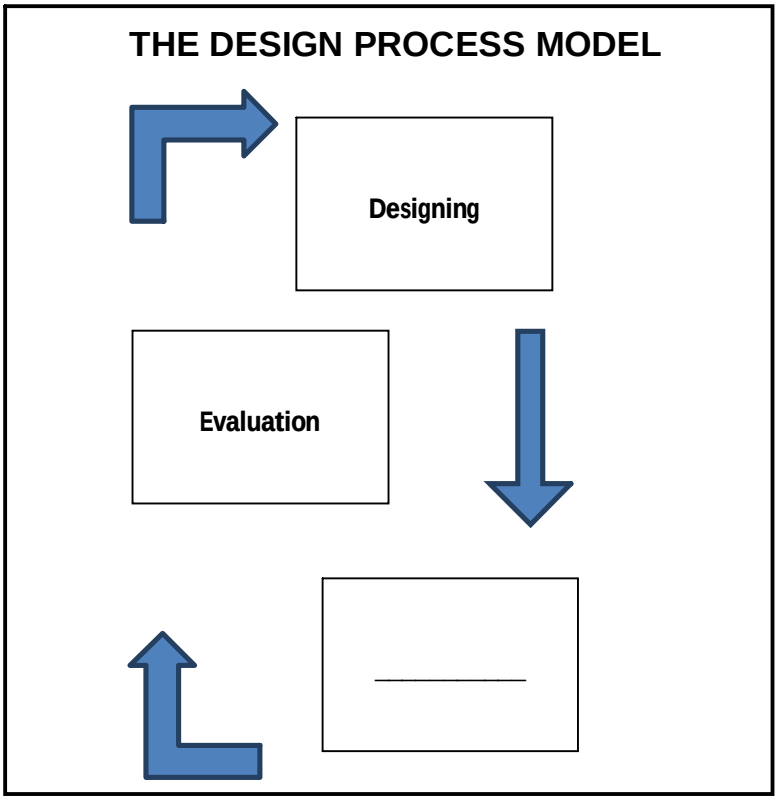
1. You have 10 minutes to read before you start the exam.
2. Write your Student Education Number (SEN) in the space provided on the top left hand corner of this page.
3. Answer ALL QUESTIONS. Write your answers in the spaces provided in this booklet.
4. If you need more space, ask the Supervisor for extra paper. Write your SEN on all extra sheets used and clearly number the questions. Attach the extra sheets at the appropriate place in the booklet.

STRANDS		Page	Time (min)	Weighting
STRAND 1:	DESIGNING AND DRAWING	2	45	25
STRAND 2:	TOOLS AND SAFETY	6	27	15
STRAND 3:	MATERIALS	11	36	20
STRAND 4:	PROCESSING	17	54	30
STRAND 5:	TECHNOLOGY	27	18	10
TOTAL			**180**	**100**

Check that this booklet contains pages 2-29 in the correct order and that none of these pages is blank.
YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

STRAND 1:	DRAWING AND DESIGNING	Weighting 25

The diagram below shows the design process model. Use the model and your own knowledge to answer Number 1 – 13.



1. Fill in the missing stage on the Design Process Model.

SL 1

2. Describe the importance of this stage in the design process.

SL 2

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_____

_____

3. Define the following terms:

(a) *Design Brief*:_____

_____

SL 1

(b) *Outcome*:_____

_____

SL 1

4. At what stage do we *"clarify the problem"*?

_____

_____

SL 1

5. Explain what is involved in the Evaluation stage of the model.

_____

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SL 3

6. Identify another part of the model that is missing.

_____

SL 1

7. Explain the importance of the missing part you named in Number 6.

_____

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SL 3

8. At what stage is a decision implemented?

_____

SL 1

9. *"Identifying the most likely idea"* is part of which stage?

_____

_____

SL 1

10. At what stage do we ask the question, *"Could it be improved?"*

_____

SL 1

11. Draw your school Independent Project, include dimensions.

SL 2

12. Use your drawing in Number 11 to calculate and list the materials needed for the project.

SL 3

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13. Evaluate your independent project and discuss how you could have improved its design.

SL 4

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ANSWER Option 1 – Wood Working Tools **OR** **Option 2 –** Engineering Tools.

OPTION 1: Wood Working Tools

Use the resources below to answer the questions that follow.

Resource A

Resource B

14. Name the tool in **Resource A** and describe what it is used for.

(a) Name_____ **SL 1**

(b) Use_____ **SL 2**

_____

15. Label the cutting part of the tool in **Resource A** with an **X**. **SL 1**

16. The tool in **Resource B** is classified as a *(tick the correct answer).* **SL 1**

Power Tool	Hand Tool

17. Describe or draw how the tool in **Resource A** should be placed on the work bench.

SL 2

_____

_____

_____

_____

18. Define the term *'Hand Tool.'*

SL 1

_____

_____

19. Discuss the importance of understanding the use of the tool in **Resource B**.

SL 4

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20. Explain why the tool in **Resource A** requires regular maintenance.

SL 3

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OPTION 2: Engineering Tools

Use the resources below to answer the questions that follow.

Resource A

Resource B

21. Label the cutting part of the tool in **Resource B** with an **X**.

SL 1

22. Name the tool in **Resource A** and describe what it is used for.

(a) Name_____ | SL 1

(b) Use_____ | SL 2

_____

23. The tool in **Resource A** is classified as a *(tick the correct answer).*

Cutting Tool	Measuring Tool

SL 1

24. Describe how the tool in **Resource A** is used.

_____

_____

_____

_____ | SL 2

25. Define the term *'Hand Tool'.*

_____

_____ | SL 1

26. Discuss the safety precaution that must be observed when using power tools.

SL 4

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27. Explain why tools require regular maintenance.

SL 3

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ANSWER Option 1 – Wood Materials **OR** **Option 2** – Metal Materials.

OPTION 1: Wood Materials

'Timber is made from cutting trees into various lengths and widths'

28. Name a local tree used for timber.

_____

SL 1

29. Name a type of local wood material that can be processed from the tree you named in Number 28.

_____

SL 1

30. Sketch a common timber defect.

_____

SL 1

31. Explain the difference between this timber and a foreign timber.

_____

_____

_____

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SL 3

32. In the table below, evaluate the quality of Chip Board and Marine Ply using the quality factors provided.

SL 4

Quality factors	Wood Material	
	Chip board	Marine Ply
Moisture Resistance		
Durability		
Strength		
Workability		

Wood material is normally dried first before being used in construction and joinery.

33. Name a method of drying timber.

_____

SL 1

34. Explain the process of drying timber you named in Number 33.

_____

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SL 3

35. Select a finish that will best preserve exterior weather boards.

_____

SL 1

The quality finish is an important factor in product marketing and sale.

36. Name a local hardwood that will give you a quality finish.

_____

SL 1

37. Describe the nature of the timber from this local hardwood.

_____

_____

_____

_____

SL 2

38. Describe an advantage of treating this timber.

_____

_____

_____

_____

_____

SL 2

OPTION 2: Metal Materials

'Metal material is widely used in engineering and metal works.'

39. Name ONE type of non-ferrous metal.

_____

SL 1

40. List ONE property of the metal you named in Number 39.

_____

_____

SL 1

41. Name a heat treatment method that can be used for this metal.

_____

SL 1

42. Explain why heat treatment is used when working this metal.

_____

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SL 3

43. Evaluate the quality of this metal in terms of strength, durability, hardness and ability to withstand stress.

SL 4

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Your pastor has requested you to build him a long coffee table.

The coffee table has the following measurements: 60cm high x 50cm wide x 90cm.

44. Select and name suitable size metal(s) you can use to make a Coffee Table.

_____

SL 1

45. Sketch to scale using your own dimensions the diagram of your Coffee Table.

SL 2

46. Describe the nature of the metal you selected for the Coffee Table.

SL 2

_____

_____

_____

_____

47. How will you join the parts of the Coffee Table?

SL 1

_____

_____

48. Select the best finish for this Coffee Table.

SL 1

_____

_____

49. Select a suitable material for the top of the Coffee Table and describe how it can be fixed onto the frame.

SL 3

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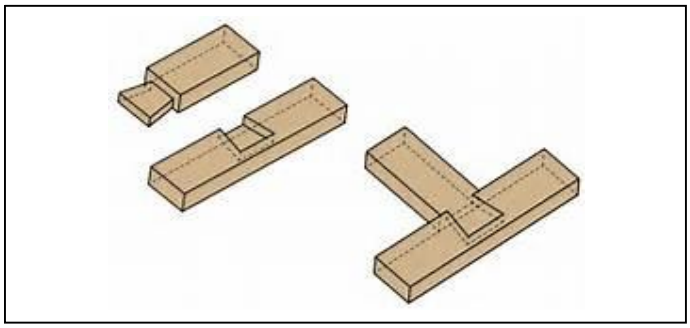
ANSWER Option 1 – Wood Technology ***OR*** **Option 2 –** Small Engine and Automotive Mechanics.

OPTION 1: Wood Technology

Use the resource below and your own knowledge to answer Number 50 to 55.



50. Name the joint in the resource.

_____

SL 1

51. Estimate the size of the material used for the joint in the resource.

_____

_____

SL 1

52. On the resource, label the **TWO** main parts of the joint.

SL 1 + SL 1

53. Give an example of where this joint is most suitable.

_____

SL 1

54. Explain the steps used for making the joint.

SL 3

_____

_____

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_____

55. Name a tool that is used for measuring the joint.

SL 1

_____

Use the diagram and your own knowledge to answer Number 56 to 60.

56. Name the type of drawing shown in the diagram above.

SL 1

_____

57. Determine the width of the table.

_____

SL 1

58. Explain why drawings are important in the making process.

SL 3

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59. Discuss and write down the cutting list of materials needed for the table in Number 56.

SL 4

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60. Calculate the total cost of materials needed for the table using your own estimated prices.

Materials	Price (Samoan Tala)

SL 2

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Reflect on your independent project and answer the following questions.

61. Draw your independent project to scale with measurements.

SL 2

62. Name a joint used in your project.

_____

SL 1

63. Name the main material used for the project.

_____

SL 1

64. List the essential tools needed to make your project.

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SL 2

65. Discuss the process you used to make your project.

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SL 4

OPTION 2: Small Engine and Automotive Mechanics

66. Describe how a 2-stroke-cycle engine works.

_____

SL 2

67. If an engine has 16 valves, how many cylinders does it have?

_____

SL 1

68. Explain how you can prevent black smoke being released from the engine exhaust.

_____

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SL 3

69. Explain the main components of a 4-stroke engine.

_____

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SL 3

70. Name a common tool used for opening the oil tank when servicing engines.

_____

SL 1

71. Define the following parts of a small engine.

(a) *Valve*

_____

_____

_____

SL 1

(b) *Cylinder*

_____

_____

_____

SL 1

(c) *Piston*

_____

_____

_____

SL 1

72. Describe how you would service a small engine.

_____

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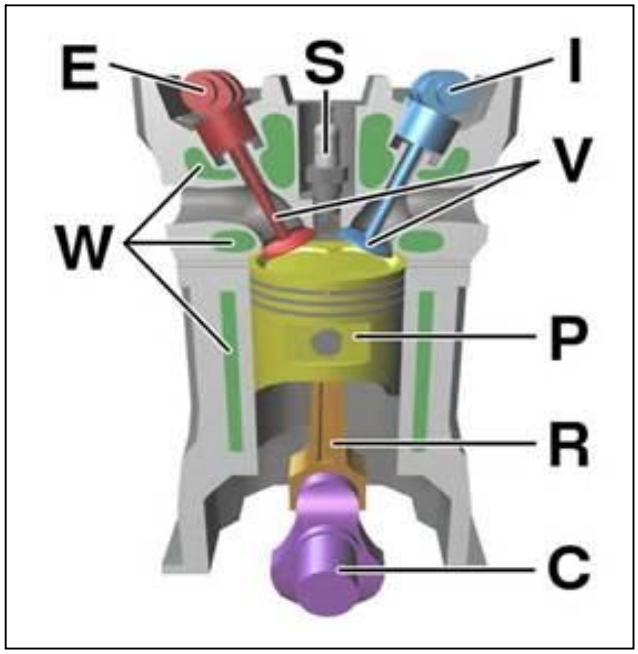
SL 2

73. The diagram below is a simple engine.



What do the letters **E, I, V** and **P** in the diagram represent?

E. _____ SL 1

I. _____ SL 1

V. _____ SL 1

P. _____ SL 1

74. Select ONE engine system and discuss how it operates.

Cooling System OR **Ignition System** OR **Fuel System** OR **Brake System**

SL 4

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75. How should tools be properly stored?

SL 1

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76. Describe why safety procedures must be followed when working with engines.

SL 2

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77. Discuss the environmental impact of the motor vehicle industry in Samoa.

SL 4

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STRAND 5: TECHNOLOGY Weighting 10

Technology is used to develop resource material for various purposes in the building and engineering industries.

78. Name an advantage of timber.

SL 1

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_____

79. Name a disadvantage of a timber type.

SL 1

_____

_____

80. Describe a forest management issue due to the use of timber.

SL 2

_____

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81. Explain the implications of a technology solution at a personnel level.

SL 3

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82. Explain the environmental impact of the construction and engineering industry at the global level.

SL 3

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DESIGN TECHNOLOGY

2017

(For Scorers only)

CURRICULUM STRANDS	Scores	Weighting
STRAND 1: DESIGNING AND DRAWING		25
STRAND 2: TOOLS AND SAFETY		15
STRAND 3: MATERIALS		20
STRAND 4: PROCESSING		30
STRAND 5: TECHNOLOGY		10
TOTAL		**100**